AIC-320
Supplement 5

Eastern Utilization Research Branch
Philadelphia 18, Pennsylvania

PUBLICATIONS AND PATENTS

OF THE

EASTERN UTILIZATION RESEARCH BRANCH

July - December 1953

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No. 801

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Publications and Patents of the Eastern Utilization Research Branch issued before 1951 are listed in AIC-180 and Supplements 1 to 6.

This supplement includes an index which covers AIC-180 and Supplements 1 through 6, and AIC-320 and Supplements 1 through 5.

AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

1953

July - December

Publications

774 Anonymous
LIST OF PUBLICATIONS AND PATENTS OF ANIMAL FATS DIVISION. AIC-359, September 1953 (Processed.)
A list of publications and patents of the Animal Fats Division from its inception in 1940 through December 31, 1952. Each is described by a brief abstract.

775 Aceto, Nicholas C., Eskew, Roderick K., and Phillips, G. W. Macpherson.
HIGH-DENSITY FULL FLAVOR CHERRY JUICE CONCENTRATES. The Glass Packer, vol. 32, p. 54, September 1953.
A process for the preparation of full-flavor high-density concentrates from Montmorency and Morello cherry juices is described. A method for developing a more intense cherry flavor in the juices is also given.

The concentrates have a strong characteristic cherry flavor and should be of interest to the users of fruit extracts. When sweetened, a palatable cherry juice can be reconstituted from either Montmorency or Morello concentrate.

776 Ard, Jesse S.
MULL AND SOLVENT MEDIA FOR INFRARED USE. Analytical Chemistry, vol. 25, p. 1743-1744, November 1953.
In infrared spectra of antibiotics, alkaloids, plant regulators and other solid materials, it is desirable to have supplementation of the sections usually obscured by the intense absorptions of accessory media.

It was found that the gaps, foreign bands, and insensitive drifts that occur as a result of these extraneous absorptions can be eliminated from the entire salt region by programs consisting of hexachlorobutadiene and paraffin oil supplementations for mull spectra, and tetrachloroethylene and carbon disulfide supplementations for solution spectra. The spectrum of hexachlorobutadiene is shown as a guide for its use. As an adequate spectrum of tetrachloroethylene has become available elsewhere, the concern here is chiefly with precautions against impurities that develop in the absence of preservatives.

Complete supplementation, such as that facilitated by these media, relieves the uncertainty of what otherwise may have been missed, decreases the need for reinvestigations, and aid recognition processes.

777 Ard, Jesse S.
GRINDERS FOR MULLING INFRARED MICROSAMPLES. Analytical Chemistry, vol. 25, p. 1780-1782, November 1953.
A mechanical grinder for mulling microsamples within a single drop of oil consists of a small anvil and a special hammer with a shaft actuated by a vibrating tool holder. The design allows intensive action and easy transfer of sample. Also, a drill reversed in its hole can be used.

778 Doukas, H. M. and Fontaine, T. D.
ACID-CATALYZED REDUCTION OF SPIROSTANOLS AND SPIROSTENOLS BY LITHIUM ALUMINUM HYDRIDE. Journal of the American Chemical Society, vol. 75, p. 5355-5356, November 5, 1953.
A new method for cleaving ring F of steroidal sapogenin with $LiAlH_4$ in the presence of anhydrous HCl or HBr is reported. By this reaction it is now possible to prepare furostene diols directly from spirostenols as well as furostane diols from spirostanols.

779 Eskew, Roderick K., Redfield, Clifford S., Eisenhardt, Nelson H., Claffey, Joseph B. and Aceto, Nicholas C.
ROOM TEMPERATURE STORAGE OF GRAPE JUICE CONCENTRATE. AIC-342, Supplement 1, September 1953. (Processed.)
The supplement states that sweetened superconcentrated Concord grape juice prepared according to AIC-342 and hot packed in glass bottles at 180° F. will store satisfactorily at room temperature. The keeping property in enameled tin cans is being investigated.

780 Halwer, M., Nutting, G. C., and Brice, B. A.
RAYLEIGH'S RATIO FOR BENZENE AND THE PROBLEM OF ABSOLUTE LIGHT SCATTERING DETERMINATIONS. Journal of Chemical Physics, vol. 21, p. 1425-1426, August 1953.
The method, previously published, for obtaining absolute light scattering ratios, of importance in molecular weight determinations, is supported by the internal consistency of the results to which it leads. Other methods are shown to lead to incorrect molecular weight values.

781 Heisler, E. G., Hunter, Ann S., Woodward, C. F., Siciliano, J. and Treadway, R. H.
LABORATORY PREPARATION OF POTATO GRANULES BY SOLVENT EXTRACTION. Food Technology, vol. 7, p. 299-302, August 1953.
A laboratory method is described for dehydrating mashed potatoes by extraction with organic liquids. The mashed potatoes are suspended three times in the liquid; after each treatment the aqueous solvent is separated from the potato solids by filtration. The final filter cake contains only about 5 percent moisture and is readily dried by mild heat. Powder prepared by this method is stable and light in color. It is easily reconstituted in water over a wide temperature range to mashed potatoes of good texture and acceptable flavor.

782 Herb, S. F., Riemenschneider, R. W., (EURB) and Kaunitz, Hans and Slanetz, Charles A. (Columbia University)
NATURE OF THE "VITAMIN A-LIKE FACTOR" IN LARD. The Journal of Nutrition, vol. 51, p. 393-402, November 1953.
Biological assays on molecular distillates from lard showed that lard contains vitamin A activity equivalent to about 0.4 to 2 units per gram.

Chromatographic fractionation of unsaponifiables from lard and molecular distillates from lard yielded eluates which gave positive Carr-Price tests and typical vitamin A spectral curves except in fractions having extremely high ratio of unsaponifiables to units of vitamin A.

It is concluded that the biological vitamin A activity of lard is largely attributable to the presence of typical vitamin A. The so-called "sparing" action of lard on utilization of added vitamin A in diets is in all probability due to the presence in lard of hitherto unrecognized typical vitamin A.

783 Hoover, Sam R., Jasewicz, Lenore and Porges, Nandor
AN INTERPRETATION OF THE B. O. D. TEST IN TERMS OF ENDOGENOUS RESPIRATION OF BACTERIA. Sewage and Industrial Wastes, vol. 25, p. 1163-1173, October 1953.
The rate of oxidation of milk solids and of bacterial cells in the B.O.D. test was measured. The results can be interpreted best as a rapid conversion of organic substrate to cell solids and a subsequent slow endogenous oxidation of these cells.

784 Hoover, Sam R., John, Harry and Mellon, Edward F.
VAPOR PRESSURE EBULLIOMETER FOR MILLILITER SAMPLES. Analytical Chemistry, vol. 25, p. 1940-1941, December 1953.
The ebulliometer, made from pyrex tubing, has a reflux bell connected with the pot by an auxiliary reflux return tube. The pot contains a tungsten wire hot spot to prevent bumping and holds about 2 ml. A ground glass joint thermometer is positioned just above the reflux bell and a side arm serves both as a vapor trap and attachment for a vacuum line.

785 Kelley, Edward G. and Baum, Reba R.
PROTEIN AMINO ACIDS. CONTENTS OF VEGETABLE LEAF PROTEINS. Journal of Agricultural and Food Chemistry, vol. 1, p. 680-683, August 5, 1953.
Leaf meals and protein concentrates prepared from leaves of beet, broccoli, carrot, celery, corn, kale, lima bean, pea, rhubarb, spinach, and turnip have been analyzed for ten amino acids, histidine, arginine, lysine, leucine, isoleucine, valine, methionine, threonine, phenylalanine, and tryptophane.

The meals were found to contain similar and nutritionally well balanced mixtures of these amino acids.

Comparison of the leaf meals with their protein concentrates showed lower amino acid values for all of the meals. These lower values were attributed to the failure of the (micro-Kjeldahl Nx6.25) factor to correctly estimate crude protein and to hydrolytic destruction of methionine under certain conditions of the analytical procedure.

786 Knight, H. B., Koos, R. E. and Swern, Daniel
ADDITION OF FORMIC ACID TO OLEFINIC COMPOUNDS. I. MONOOLEFINIC COMPOUNDS. Journal of the American Chemical Society, vol. 75, p. 6212-6215, December 20, 1953.
Formic acid at its boiling point at atmospheric pressure adds readily to the double bond of oleic, elaidic and 10-hendecenoic (undecylenic) acids, methyl oleate, oleyl alcohol, cyclohexene, 1-hexene and the unreacted olefinic material separated from the hydrolyzed reaction product of oleic acid with formic acid, yielding the corresponding formate esters which are readily hydrolyzed to hydroxy compounds.

787 Kramer, Amihud and El-Kattan, A. A. (University of Maryland, work done under Research and Marketing Act contract).
EFFECT OF APPLICATION OF HEAT ON TOMATO JUICE COLOR. Food Technology, vol. 7, p. 400-404, October 1953.
The effect of heat application on the loss of color in tomato juice was found to proceed in accordance with the equation: Color loss = $\log \frac{Ts}{525} \left(\frac{RT - 120}{40}\right)$, where color loss is in terms of the Department of Agriculture scoring system, Ts refers to temperature summations in terms of degrees F, above 140° times seconds, and RT is the retort temperature.

788 Luddy, Francis E., Turner, Arthur, Jr., and Scanlan, John T.
SPECTROPHOTOMETRIC DETERMINATION OF CHOLESTEROL AND TRITERPENE ALCOHOLS IN WOOL WAX. Analytical Chemistry, vol. 25, p. 1497-1499, October 1953.
The method described is based on the Liebermann-Burchard color reaction and can be applied to unsaponified wool wax, to mixtures of free wool wax alcohols or to precipitated cholesterol digitonide. The entire procedure can be carried out at room temperature.

789 Ma, Roberta M. and Schaffer, P. S.
Beta-SITOSTERYL D-GLUCOSIDE AND Beta-SITOSTEROL FROM COMMERCIALLY DRIED GRAPEFRUIT PULP. Archives of Biochemistry and Biophysics, vol. 47, p. 419-423, December 1953.
Both beta-sitosteryl D-glucoside and beta-sitosterol were isolated from commercially dried grapefruit pulp and from grapefruit seeds. Infrared data showed that these compounds are identical with those isolated from orange juice. These compounds were found to have a low order of antifungal activity.

790 Mellon, Edward F., Korn, Alfred H., Viola, Samuel J., Miller, Nancy, and Hoover, Sam R.
ISOLATION OF AMINO ACIDS BY DISTILLATION OF THE ACETYLATED AMINO ACID ETHYL ESTERS. Journal of the American Chemical Society, vol. 75, p. 5524-5528, November 20, 1953.
Pure optically active amino acids were isolated from fractions obtained by distillation of the mixed acetylated amino acid ethyl esters produced from a protein hydrolyzate.

791 Morgan, Donald A. and Veldhuis, M. K. (U. S. Citrus Products Station) and Eskew, R. K. and Phillips, G. W. M. (EURB)
STUDIES ON THE RECOVERY OF ESSENCE FROM FLORIDA ORANGE JUICES. Food Technology, vol. 7, p. 332-336, August 1953.
There is described a system for recovering water soluble essence from orange juice under vacuum without damage to the flavor of the juice. The effect of restoring the recovered essence to orange juice is described.

792 Mullins, W. R. and Olson, R. L. (WURB), and Treadway, R. H. (EURB)
CONTROL OF DISCOLORATION OF PEELED WHITE POTATOES AND METHODS FOR ANALYSIS OF TREATING SOLUTIONS. AIC-360, August 1953 (Processed).
Suggestions are offered for a process to be used in plants. Methods are presented for the measurement of sodium bisulfite in treating solutions, including solutions that contain citric acid or other acids.

793 Porges, Nandor
YEAST, A VALUABLE PRODUCT FROM WASTES. Journal of Chemical Education, vol. 30 p. 562-565, November 1953.
Yeasts and means of their propagation are described. The value of yeast protein is discussed as well as the yields available from carbohydrate material. The aerobic disposal of wastes by the aerobic propagation of yeast offers a means for the recovery of an important feed supplement.

794 Porges, Nandor, Jasewicz, Lenore and Hoover, Sam R.
A MICROBIOLOGICAL PROCESS REPORT. AEROBIC TREATMENT OF DAIRY WASTES. Applied Microbiology, vol. 1, p. 262-270, September 1953.
Dairy waste disposal is a branch of applied microbiology in which the biochemical oxidizing abilities of microorganisms are utilized. The high oxygen-demanding wastes are converted by aeration to cell substances of low B.O.D. About 37.5 percent of the organic matter is completely oxidized in the rapid growth period while 62.5 percent is assimilated into cell material, which is further oxidized over longer periods of aeration.

795 Port, William S., Jordan, Edmund F., Jr., Palm, William E., Witnauer, Lee P., Hansen, John E. and Swern, Daniel.
VINYL PLASTICS MODIFIED WITH CHEMICALS FROM ANIMAL FATS. COPOLYMERS OF VINYL CHLORIDE AND VINYL STEARATE. AIC-366, December 1953 (Processed).
Copolymers of vinyl chloride containing approximately 10 to 45 percent vinyl stearate were prepared in suspension and in emulsion, and tensile, flexural, visocity and low temperature properties were measured. The copolymers can be cured with polyamines to infusible and insoluble materials. Addition of carbon black or silica produces a reinforced plastic which can also be cured.

796 Roe, Edward T., and Swern, Daniel
FATTY ACID AMIDES. VI. PREPARATION OF SUBSTITITED AMIDOSTEARIC ACIDS BY ADDITION OF NITRILES TO OLEIC ACID. Journal of the American Chemical Society, vol. 75, p. 5479-5481, November 20, 1953.
The addition of acetonitrile, propionitrile, acrylonitrile, benzonitrile, cyanoacetic acid, malononitrile and succinonitrile to the double bond of oleic acid in sulfuric acid solution gives good yields of substituted amidostearic acids,

$$CH_3-(CH_2)_x-\underset{\displaystyle N-H\\ \displaystyle C=O\\ \displaystyle R}{CH}-(CH_2)_y-CO_2H$$

797 Rothman, Edward S., Wall, Monroe E. and Cooper, Harriet G.
STEROIDAL SAPOGENINS. X. QUALITATIVE COLOR TEST FOR PSEUDOSAPOGENINS. Journal of the American Chemical Society, vol. 75, p. 6325-6326, December 20, 1953.
A modification of the Tortelli-Jaffe color reaction can be used qualitatively to identify the pseudosapogenin structure. The reaction is useful in determining the end point in pseudosapogenin transformations e.g. hydrogenation, oxidation, and the like.

798 Satta, V., Fein, M. L., and Filachione, E. M.
SOME ESTERS OF UNSATURATED ACIDS. Journal of the American Chemical Society, vol. 75, p. 4101, August 20, 1953.
Various esters of crotonic, maleic, fumaric, chloromaleic, itaconic, and aconitic acids were prepared, and their physical constants were reported.

799 Swern, Daniel, Coleman, Joseph E., Knight, H. B., Ricciuti, C., Willits, C. O. and Eddy, C. Roland
REACTIONS OF FATTY MATERIALS WITH OXYGEN. XIV. POLAROGRAPHIC AND INFRARED SPECTROPHOTOMETRIC INVESTIGATION OF PEROXIDES FROM AUTOXIDIZED METHYL OLEATE. Journal of the American Chemical Society, vol. 75, p. 3135-3137, July 5, 1953.
Methyl oleate has been autoxidized from 35° to 120° in the presence or absence of ultraviolet radiation. Polarographic and iodometric analysis of the autoxidation mixtures and peroxide concentrates obtained from them has shown that, although the bulk of the peroxides formed are hydroperoxides, a significant proportion is not. Evidence is presented which indicates that the non-hydroperoxide portion probably consists of cyclic peroxides. Furthermore, the hydroperoxides have the trans configuration, predominatly.

800 Swern, Daniel, Coleman, Joseph E., and Knight, H. B. (EURB), Zilch, K. T. , Dutton, H. J., and Cowan, J. C. (NURB) and Gyenge, J. M. (Government Laboratories, University of Akron).
PEROXIDES FROM AUTOXIDIZED METHYL OLEATE AND LINOLEATE AS INITIATORS IN THE PREPARATION OF BUTADIENE-STYRENE SYNTHETIC RUBBER. Journal of Polymer Science, vol. 11, p. 487-490, November 1953.
In a dextrose-free recipe at 41° F. for the copolymerization of butadiene and styrene, methyl oleate peroxide (MOP) and methyl linoleate peroxide (MLP) are more efficient initiators on a molar, but not on a weight basis than cumene hydroperoxide (CHP), and they are as efficient as p-menthane hydroperoxide (PMHP). In a peroxide-dextrose recipe at 122° F., at both low and high dextrose levels, only about one-half as much MOP as CHP or PMHP is required on a molar basis to achieve the same conversion and polymerization rate. In a low dextrose-redox recipe at 41° F., MLP appears to be slightly more efficient than CHP or PMHP, but in the amine recipe at 41° F., MLP is less efficient.

801 Swern, Daniel and Scanlan, John T.
ELAIDIC ACID. Biochemical Preparations, vol. 3, p. 118-120, October 1953.
A laboratory procedure suitable for use in the preparation of pure elaidic acid is described.

802 Treadway, R. H. (EURB) and Olson, R. L. (WURB)
TREATMENT AND PACKAGING OF PRE-PEELED POTATOES. American Potato Journal, vol. 30, p. 283-288, December 1953. Pre-Pack Age, vol. 7, no. 4, p. 13-16, December 1953.
Methods of processing and packaging peeled potatoes for restaurant and institution trade are discussed.

803 Turner, Arthur, Jr.
REPORT ON RUTIN IN TABLETS. Journal of the Association of Official Agricultural Chemists, vol. 36, p. 699-707, August 15, 1953.
A spectrophotometric method for determining rutin in pharmaceutical tablets is described. The method was subjected to collaborative test in 19 laboratories and is recommended for adoption by the A.O.A.C.

804 Wall, Monroe E., Eddy, C. Roland, Serota, Samuel and Mininger, Robert F.
STEROIDAL SAPOGENINS. VIII. MARKOGENIN (22b-SPIROSTANE-2ξ,3 beta-DIOL). A NEW SAPOGENIN ISOLATED FROM YUCCA. Journal of the American Chemical Society, vol. 75, p. 4437-4440, September 20, 1953.
Markogenin (Spirostan-2ξ, 3beta-diol) a new steroidal sapogenin, has been isolated from certain yucca species. The structure of the compound has been determined from chemical and infrared data. The new sapogenin is distinctly different from the previously reported texogenin which is stated to have the same structure.

805 Weil, J. K., Bistline, R. G. Jr., and Stirton, A. J.
SODIUM SALTS OF ALKYL alpha-SULFOPALMITATES AND STEARATES. Journal of the American Chemical Society, vol. 75, p. 4859-4860, October 5, 1953.
Twenty-two esters of alpha-sulfonated palmitic and stearic acids were prepared from normal primary alcohols of 1 to 18 carbon atoms. Sodium secondary butyl alpha-sulfopalmitate and sodium isopropyl alpha-sulfostearate were also prepared. The esters are surface active agents.

806 Weil, Leopold, James, S., and Buchert, A. R.
PHOTOOXIDATION OF CRYSTALLINE CHYMOTRYPSIN IN THE PRESENCE OF METHYLENE BLUE. Archives of Biochemistry and Biophysics, vol. 46, p. 266-278, October 1953.
Controlled photooxidation of chymotrypsin was carried out in order to correlate the observed chemical and physical changes with enzymatic activity. The possible importance of histidine within the enzyme molecule was emphasized.

807 Willaman, J. J., Fenske, C. S., (EURB) and Correll, D. S. (Horticultural Crops Res. Branch)
OCCURRENCE OF ALKALOIDS IN DIOSCOREA. Science, vol. 118, no. 3064, p. 329-330, September 18, 1953.
Evidence is presented that alkaloids probably do not occur in dioscoreas native to the Western hemisphere, but that they do occur in species native to other parts of the world.

808 Willits, C. O., Gaspar, M. and Naghski, J.
COLLABORATIVE STUDY OF METHODS FOR ANALYSIS OF TOBACCO. NICOTINE AND MOISTURE. Journal of the Association of Official Agricultural Chemists, vol. 36, p. 1004-1018, August 15, 1953.
A report of results obtained in a preliminary collaborative study of methods for analysis of tobacco for nicotine and moisture, together with recommended changes in the procedure to be tested by further study.

809 Willits, C. O., Ricciuti, C., Ogg, C. L., Morris, S. G. and Riemenschneider, R.W.
FORMATION OF PEROXIDES IN FATTY ESTERS. I. METHYL OLEATE. APPLICATION OF THE POLAROGRAPHIC AND DIRECT OXYGEN METHODS. Journal of the American Oil Chemists Society, vol. 30, p. 420-423, October 1953.
A study was made of the prolonged autoxidation of methyl oleate to determine the type of peroxide formed and the fate of the absorbed oxygen. This study has shown that the principal peroxide formed is a hydroperoxide and that the oxygen absorbed in the autoxidation forms oxygenated materials other than hydroperoxide.

810 Woodward, C. F. and Talley, E. A.
REVIEW OF THE NITROGENOUS CONSTITUENTS OF THE POTATO. NUTRITIVE VALUE OF THE ESSENTIAL AMINO ACIDS. American Potato Journal, vol. 30, p. 205-212, September, 1953.
Nitrogenous constituents of the potato, which account for 6 to 12 percent of the dry weight, include the amino acids, amides, proteins, enzymes, certain vitamins, and other basic compounds such as the alkaloid solanine. The essential amino acids are of particular interest from a nutritional standpoint. It is calculated that the average daily ration of fresh potatoes in the United States contains the following approximate percentages of the minimum essential amino acid requirements. Tryptophan, 8; phenylalanine, 12; lysine, 16; threonine, 18; valine, 15, methionine, 4-5; leucine, 14, isoleucine, 13. These percentages should be multiplied by 4 for countries such as Germany, Belgium, and France, in which the annual per capita consumption of potatoes approximates 400 pounds.

811 Yanovsky, E.

ALLYL STARCH -- A REVIEW. AIC-362, September 1953 (Processed.)
A review of literature on allyl starch (and other allyl ethers). A list of 79 references.

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Patents

COPIES OF PATENTS MAY BE PURCHASED FROM

THE UNITED STATES PATENT OFFICE, WASHINGTON 25, D. C.

Fisher, Charles H. and Mast, William C.
SYNTHETIC RUBBERLIKE MATERIALS FROM AN ALKYL ACRYLATE AND AN ALIPHATIC DIENE HYDROCARBON. U. S. Patent No. 2,643,247, issued June 23, 1954.

Ratchford, William P.
4,4,6-TRIMETHYL-2-(1-HYDROXYETHYL)-5,6-DIHYDRO-1,3-4H-OXAZ'INE. U. S. Patent No. 2,648,664, issued August 11, 1953.

Rehberg, Chessie E. and Fisher, Charles H.
CURING POLYMERS OF MONOETHYLENIC ETHERS AND ETHER-ESTERS. U. S. Patent No. 2,654,717, issued October 6, 1953.

Index to publications listed in AIC-180 and Supplements 1 through 6, and AIC-320 and Supplements 1 through 5 (1939 through 1953). The numbers refer to the numbers of the publications in the lists; for those with an asterisk, reprints were not available at the time the index was prepared.

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